Fisher Labs

F70

Metal Detector

Users Manual

MADE IN THE U.S.A.

The F70 is a multipurpose metal detector.
It's most popular uses are coinshooting and relic hunting.

Product Features

- Light weight and well-balanced
- Menu-driven user interface
- Large LCD screen
- Visual indicators of important values such as:
  - Target Identification
  - Target Confidence
  - Target Depth in Pinpoint Mode
  - Ground Mineralization (Dirt indicator)
- Two Search Modes:
  - Discrimination
  - Autotune
- GroundGrab™ touch pad ground balancing
- Waterproof 9 3/4" open-frame concentric elliptical search coil
- Touch pad actuated target pinpointing with variable audio pitch
- Adjustable Arm Rest
- Notch and discrimination controls
- Two retrievable user-programmed memory settings

If you have any questions, or need assistance with your metal detector, Call **915-225-0333** or **1-800-685-505**, and ask for Fisher Hobby Technical Service.

Copyright Fisher Research Labs, Inc., September 17, 2008

Table Of Contents

Specifications 4

Quick-Start 5

Mechanicals

- Assembly Instructions 7
- Mechanicals 8
- Arm Rest Adjustment 8
- Using Headphones (not included) 8

Introduction to the F70

- General Information 9
- Controls 10-11
- Menu System 12
- Ground Balancing 13-15
- Autotune Mode 16
- Discrimination Mode 17-19
- Pinpoint Feature 20
- LCD Visual Display 21-23
- Frequency Shifting 24
- Capabilities & Limitations 25-27

Tips & Techniques

- Search Techniques
  - How to Sweep the Search Coil 28
  - Pinpointing Targets 28
  - Estimating Target Size, Depth, & Shape 29
  - False Signals & Chatter 30
  - Adjusting Sensitivity 32
  - Tips on Ground Balancing 33
- Detecting Activities
  - Coinshooting 34
  - Relic Hunting 34-35
  - Gold Prospecting 36-37
  - Cache Hunting 37
  - Shallow Water Hunting 38
  - Salt-Water Hunting 38
- How Metal Detectors Work 39

Warranty 40

Specifications

Mechanical:	3-piece breakdown aluminum pole system, batteries under elbow, Armrest adjustment - forward/backward.
Search coil:	9 3/4" open-frame waterproof concentric elliptical search coil.
Batteries:	4 AA, alkaline (included).
Weight:	2 pounds 15 ounces (1.3kg), with alkaline batteries installed.
Operating Principle:	VLF induction balance
Operating Frequency:	nominal 13 kHz, quartz crystal timing reference
Basic Sensitivity:	6 x 10^9 root Hertz (detectivity)
Lag Coefficient:	78 milliseconds
Overload:	standard 10" elliptical concentric Reactive approximately 10,000 micro-cgs Resistive approximately 1,200 micro-cgs accessory 11" bi-axial Reactive approximately 30,000 micro-cgs Resistive approximately 3,700 micro-cgs
Resistive Overload:	approximately 1,200 micro-cgs units (volume susceptibility) 4,800 micro-cgs units with sensitivity < 30.
Ground Balancing Range:	From ferrite to salt, inclusive
Discrimination Ground Suppression:	combination of second and third order methods
ID Ground Suppression:	third order
Battery Life:	Typically 40 hours with high quality alkaline batteries Estimated 80 hours with nickel oxyhydroxide batteries Estimated 65 hours with lithium iron disulfide batteries
Operating Temp Range:	4 to +122 degrees F (-20 to +50 degrees C)
Operating Humidity Range:	0-90% non-condensing

Quick Start

Use your F70 right out of the box

1. Assemble the detector (see instructions beginning page 4).

2. Install four AA **alkaline** batteries. **All positive (button-end) terminals point up.**
   Batteries are included with the detector.

3. Turn the knob, located under the armrest, fully clockwise.
   This turns the machine on and sets audio volume to maximum.

4. When first turned on, the **F70** starts out in the Discrimination mode, with presets at:
   Discrimination Level = 15 (iron eliminated) in both program-1 and -2.
   Speed = dE
   Sensitivity = 60
   Threshold = 0
   Number of Tones = 3

   Sweep the search coil from side to side, parallel to the ground. Keep the search coil moving over the ground. If you stop moving the search coil, the sound will also stop. Probable target type will be indicated at the top of the LCD screen.

5. If the search coil is not in motion and not close to metal, the detector should be silent.

6. If you experience false signals from electrical interference, from the soil itself, or from lots of trash metal, press MENU button until:
   Sensitivity is highlighted.
   Press "-" as needed
   Reduce the sensitivity setting until the false signals go away.
   After 7 seconds, the machine will exit the menu, unless you exit by pressing MENU first.

7. Toss a coin on the ground and sweep back and forth over it a few times to get a feel for how the machine responds.

8. You are now ready to search.

9. Press-and-Hold the PINPOINT button to pinpoint the exact location of targets, making them easier to unearth.

   When Pinpoint is held ....
   The search coil need not be in motion to detect an object.
   The 2-digit numeric display indicates approximate target depth, in inches.

Assembly

1. Remove all components from box.

2. Attach **search coil** to **lower stem** by lining up the holes.
   *Notice that the lower stem is supplied with **no rubber washers.*** Push **coil bolt** through hole and tighten gently with coil knob. *You will tighten up the coil knob later.*

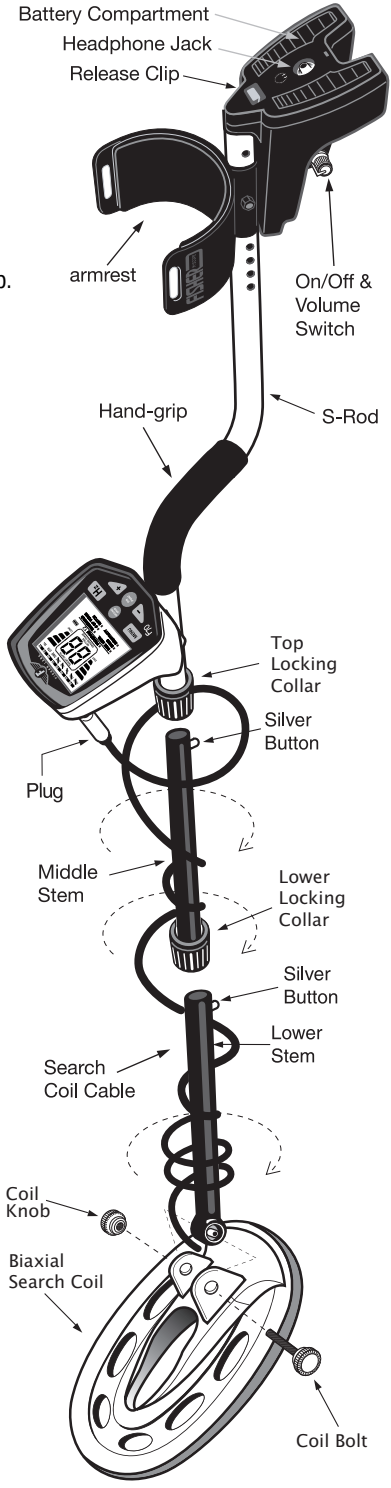
3. Insert **middle stem** into **S-rod** (S-rod holds detector body).
   Turn **top locking collar** counter-clockwise to open up.
   Push in **pin** on middle stem.
   Slide middle stem into S-rod.
   Click pin into hole and tighten top locking collar firmly clockwise.

4. Push **lower stem** into **middle stem** as follows:
   Turn lower locking collar counterclockwise to open up.
   If plastic insert tab interferes, push it down, or turn tube upside down.
   Push in pin to allow rod to slide in. Slide lower stem in. Then click pin into any hole.

5. Remove **velcro strips**.

6. Wrap **cable** around stem as follows:
   Leave some slack in cable at base of lower stem.
   Secure cable at base of lower stem with velcro strip.
   Wrap cable loosely around entire stem up to bent part of upper rod.
   You will re-wrap the cable later after sizing the rods to your height.

7. Push cable into connector on back of housing.
   Do not twist the cable or plug.
   Turn knurled cap nut only. Do not cross thread.



Assembly (continued)

8. Tighten **knurled cap nut** by hand to secure cable connection to housing.
   Do not twist the cable or plug.

   IT IS VERY IMPORTANT THAT THE NUT ROTATE FREELY AT FIRST (do not cross thread),
   After a free-rotation start to threading, insure that the NUT IS TIGHTENED FIRMLY. One thread will still be visible when the nut is tightened securely.

9. Adjust to your height:
   Hold detector, standing up, with your arm in the **armrest.**
   Place search coil flat on the ground with back edge of coil 6" in front of your toes.
   Click pin on lower stem into nearest hole.
   Firmly tighten **lower locking collar** to secure lower stem.

10. Attach cable to top of of the middle stem with the other **velcro strip.**

11. Tighten up **coil knob** to keep search coil from flopping.

12. Insert batteries.
    4 batteries are all installed the same way — **positive terminals pointed upward.**

After establishing a comfortable length, **firmly tighten the locking collars** on the rods to prevent the tubes from rattling. Rotate the collars a full 270° to engage and lock in place. If you are unable to rotate a full 270°, use gloves for a better grip.

If the search coil appears crooked with respect to the pole, loosen both locking collars and re-adjust. Hold each of the stem in the counterclockwise position as you tighten.

Mechanicals

BATTERIES

The **F70** requires four AA batteries.
These **non-rechargeable** chemistries may be used: Alkaline, Nickel Oxy-Hydroxide (Panasonic Oxyride or Duracel PowerPix), and lithium iron disulfide (Energizer L91). Nickel metal hydride and nickel-cadmium **rechargeable** chemistries may also be used.

Zinc-carbon and so-called “heavy duty” batteries may not work, especially in cold weather. Do not use these batteries.

Expect 40 hours of service in the field with one set of alkaline batteries.
Rechargeable batteries will usually deliver over 25 hours of service without recharging, but when they start running low, they die suddenly with little warning.

Always install batteries which are of the same type and the same state of charge. Otherwise battery life will be determined by the weakest battery, because the good batteries cannot deliver their power with a dead battery blocking the current.

All 4 batteries are installed with the **positive terminals facing upward.**

The LCD screen shows battery condition on the right.

ARM REST

The arm rest is adjustable up and down the pole.

If you notice unwanted movement while swinging the detector, check the tightness of the locking collars. The locking collars must be rotated a full 270° to reach the locking position.

HEADPHONES (not included)

The **F70** is equipped with a standard 1/4-inch stereo headphone jack at the rear of the unit, located under the elbow as you hold the detector for use. Any headphone with a 1/4” stereo plug should work; headphones with a mono plug will not work. A few electronic head phones may not be compatible. This device is to be used with interconnecting cables/headphones shorter than three meters.

Using headphones (not supplied) improves battery life, and prevents the sounds from annoying bystanders. It also allows you to hear subtle changes in the sound more clearly, particularly if searching in a noisy location. For safety reasons, do not use headphones near traffic or where other dangers, like rattlesnakes, are present.
This device is to be used with interconnecting cables/headphone cables shorter than three meters.

Introduction to the Fisher F70

HIGH PERFORMANCE The **F70** is a multi-purpose high-performance computerized metal detector. It has the high sensitivity and ground balancing control needed for even the most challenging soil conditions, the discrimination responsiveness needed for serious relic hunting under difficult conditions, and visual target ID considered essential in searching for coins. The **F70** operates at 13 kHz for good sensitivity to gold nuggets and jewelry as well as to coins. The **F70** comes with a 9 3/4"-inch open-frame waterproof concentric elliptical search coil for broad sweep yet narrow target pinpointing.

USER COMFORT The **F70** is among the lightest and best balanced of all high-performance metal detectors, so you can hold and swing it almost effortlessly. The grip is durable high-friction foam elastomer, comfortable in any kind of weather. The controls are conveniently located and easy to learn how to use. Locking collars on the tubes eliminate rattling.

EASY-TO-USE & INFORMATIVE INTERFACE The entire menu is always visible on the LCD display. The LCD display indicates the electrical signature (target I.D.) of the detected metal object. The display provides continuous information on battery condition and on ground mineralization, which affects detection depth.

LOW OPERATING COST The **F70** is powered by four AA alkaline batteries, which will typically last for more than 40 hours of use before needing replacement.

DESIGNED BY SOME OF THE INDUSTRY'S MOST TALENTED ENGINEERS The lead engineer on the **F70** design team was John Gardiner. John's previous Fisher design credits include the F75, F4, and F2. Assisting John Gardiner were John Griffin, Dave Johnson, Mark Krieger, and Gerhard Staiger.

MECHANICAL ENGINEERING

While the **F70** is robustly engineered for outdoor use, it is not indestructible and it is not waterproof.

RESET function

The **F70's** microprocessor will save all settings which you input, even after the power is turned off.

If you wish to reset the settings to the factory preset, follow this process:

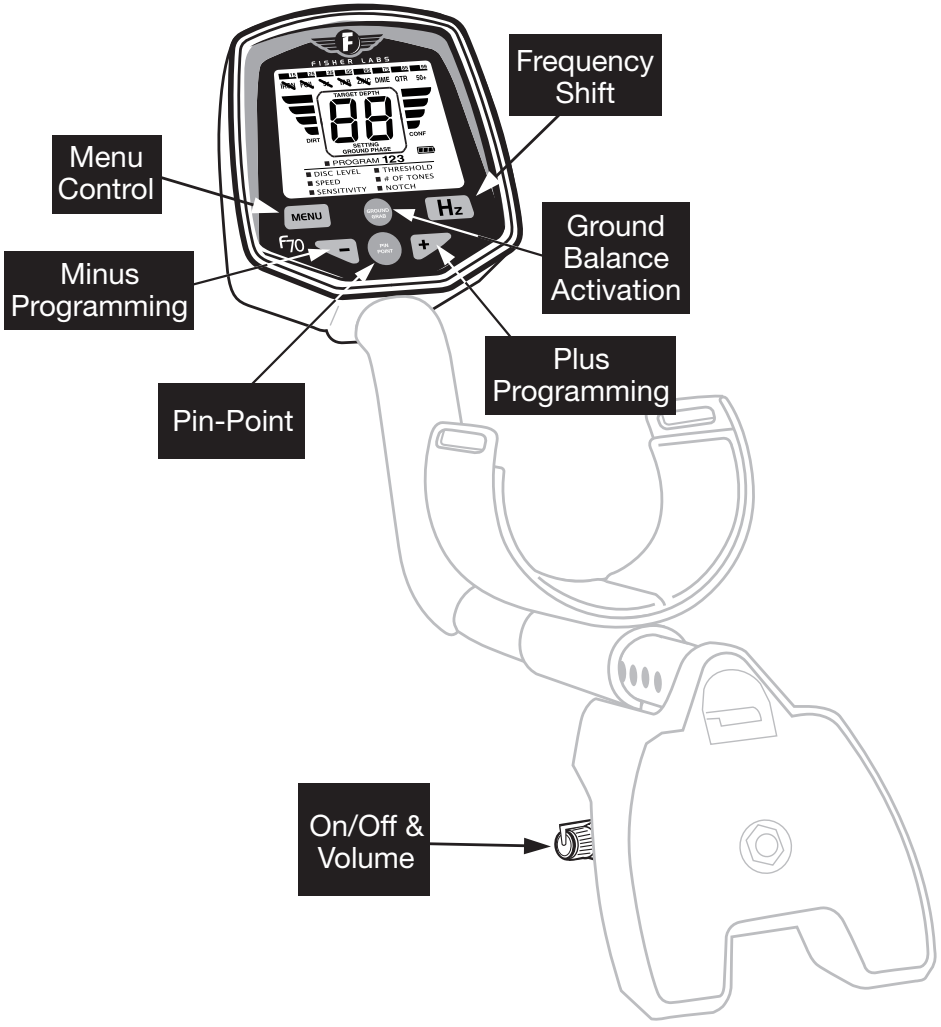
1. Turn detector off.
2. Press-and-hold both the GROUNDGRAB and MENU buttons.
3. Turn the detector on, while you are still pressing the buttons.
4. Detector displays "88".
5. Release the buttons.
6. The detector is reset, and operating in program-1.

Controls

ON-OFF & VOLUME Knob (Under the elbow)

This knob turns the machine on or off, and controls speaker volume and headphone volume.
Knob position has no effect on detector's sensitivity or susceptibility to noise from electrical interference

The **F70** has six controls on the front panel.



MENU button

Push the MENU button to:

1. Step through the menu selections on the display.
   With each push of the button, the next menu selection will be highlighted.
   The - or + buttons then allows you to change values for the highlighted selection.

2. Recall the last setting which you adjusted.
   After you have adjusted a setting, the ■ indicator will remain highlighted next to this menu selection. One push of the MENU button will recall that selection and display the stored value.

   This recall function is useful for a value you want to adjust frequently.

+ and - buttons

Press + or - buttons to change the settings (or value) of the highlighted menu selection you have chosen.

PINPOINT button

While the button is depressed, metal objects are temporarily detected without the need for search coil motion. This aids in pinpointing the exact location of objects which were found while searching in the Discrimination or Autotone modes.

GROUND GRAB

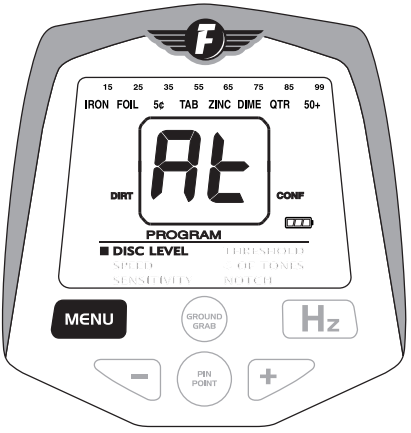
Press-and-hold the button to activate automatic ground balancing. The internal computer measures the magnetic properties of the soil in order to cancel interference from naturally-occurring minerals in the ground. After the detector measures the soil in this manner, the detector then uses this information to control operation in both the Discrimination and Autotune search modes. GROUND GRAB can be used at any time during operation. The coil must be pumped up and down over the ground while holding the button. See section on ground balancing.

Hz

Pressing this button changes the detector's operating frequency. Use this feature if you suspect that the detector is behaving erratically due to the presence of electrical interference from some other electronic device. Press and release one time to change to another frequency. Default value is 4. There are a total of 7 frequencies. *Note that after changing frequencies, you need to ground balance the detector again, as changing operating frequencies will move the ground balance point.*

The Menu System

The entire menu is printed on the LCD display.



There are two search modes, Discrimination and Autotune.

To select the **Autotune** mode:

1. Press MENU until the DISC LEVEL line of the menu system is highlighted.
2. Press "-" until the display reads **"At"**.

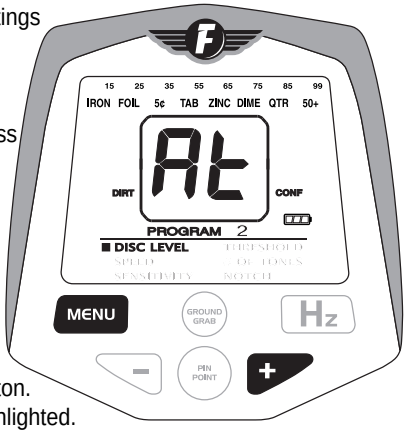
To return to **Discrimination** mode:

1. Press MENU until the DISC LEVEL line of the menu system is highlighted.
2. Press "+" until a value other than **"At"** is displayed.

Each search mode has several adjustable function settings:

AUTOTUNE: Speed, Sensitivity, Threshold.

DISCRIMINATION: Discrimination Level, Speed, Sensitivity, Threshold, # of Tones, and Notch.



You can establish two different sets of program settings for recall, using the PROGRAM selection.

- The number next to "PROGRAM" indicates which program is active.
- To change from one program to another, press "+" or "-" while "PROGRAM" is highlighted.
- Press "+" to choose program-2.
- Press "-" to choose program-1.

One convenient application for PROGRAM is to change easily between the Autotone and Discrimination modes.

To do this, program the two modes as follows:

1. Go to DISC LEVEL. Select **"At**" with "-" button.
2. Then press MENU until "PROGRAM" is highlighted.

Press "+" or "-" to change the program number.

Then press MENU to move down to DISC LEVEL and press "+" or "-" to choose a DISC LEVEL setting other than **"At"**.

Then toggle between the two modes, or programs, as follows:

1. Press MENU until PROGRAM is highlighted.
2. While "PROGRAM" is highlighted, press "+" or "-" to change between modes.

If you are programming the detector after pressing MENU and do not press a button after 7 seconds, the detector will exit the menu system automatically, and resume normal operation. Any value currently displayed will be saved into memory.

If you press the MENU button while the machine is in normal operation, the user interface will return to the last menu selection you had adjusted. The last menu selection is indicated while the menu system is inactive with a highlighted ■ symbol.

Ground Balancing

WHAT IS GROUND BALANCING?

All soils contain minerals. Signals from ground minerals are often tens or hundreds of times as strong as the signal from a buried metal object. The magnetism of iron minerals, found in nearly all soils, causes one type of interfering signal. Dissolved mineral salts, found in some soils, are electrically conductive, causing another type of interfering signal.

Ground Balancing is the process by which the metal detector cancels the unwanted ground signals while leaving signals from buried metal objects intact. This is accomplished by establishing the detector's internal Ground Balance setting; this setting is calibrated to the soil and eliminates the signal produced by ground minerals.

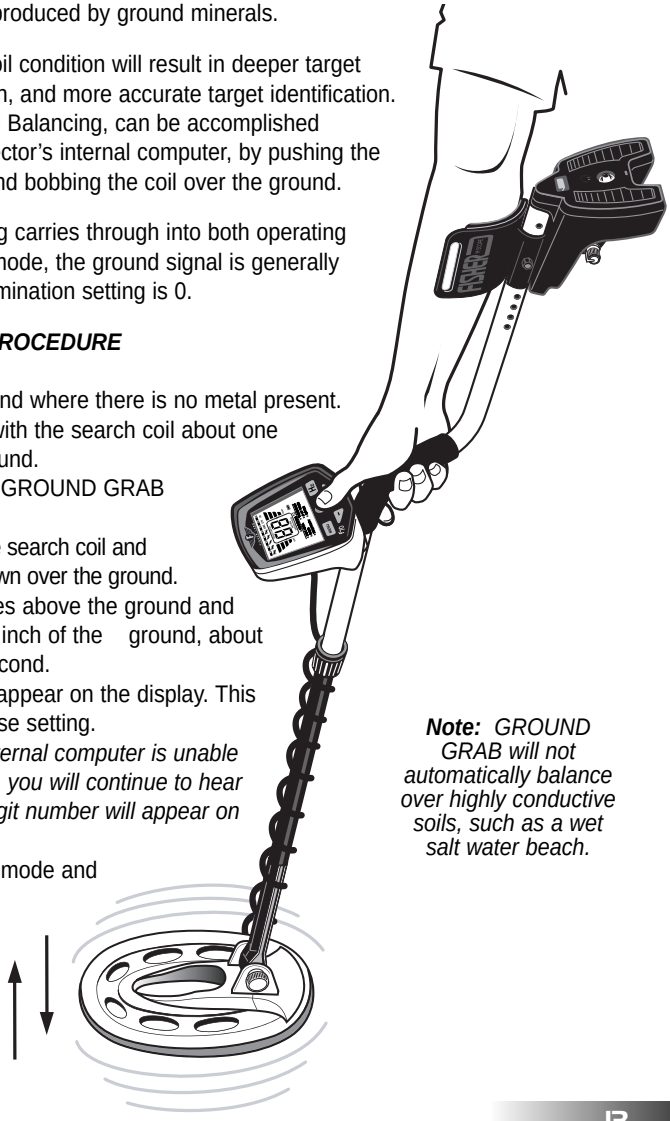
Calibration to the actual soil condition will result in deeper target detection, quieter operation, and more accurate target identification. This calibration, or Ground Balancing, can be accomplished automatically with the detector's internal computer, by pushing the GROUND GRAB button and bobbing the coil over the ground.

The ground balance setting carries through into both operating modes. In Discrimination mode, the ground signal is generally inaudible unless the discrimination setting is 0.

GROUND BALANCING PROCEDURE

(GROUNDGRAB™)

1. Find a spot of ground where there is no metal present.
2. Hold the detector with the search coil about one foot above the ground.
3. Push-and-hold the GROUND GRAB button.
4. Physically *pump* the search coil and detector up and down over the ground. Lift it about 6 inches above the ground and lower it to within 1 inch of the ground, about once or twice a second.
5. A 2-digit value will appear on the display. This is the Ground Phase setting.
   If the detector's internal computer is unable to ground balance, you will continue to hear sound and no 2-digit number will appear on the screen.
   If you are in DISC mode and do not ground balance successfully, try changing to Autotune, and re-attempt the groundgrab procedure.



Note: *GROUND GRAB will not automatically balance over highly conductive soils, such as a wet salt water beach.*

Ground Balancing (continued)

The range of ground balance settings indicated on the display range from 0 to 99.

DIRT

The DIRT bar graph on the LCD display indicates the *amount* of magnetic mineralization. The search coil must be in motion to measure mineralization. The most accurate measurement is obtained by *pumping* the search coil, as in the Ground Balancing procedure.

The two-digit GROUND PHASE number displayed on the LCD indicates the *type* of ground mineralization.

Some typical ground mineralization types are:

0 – 10	Wet salt and alkali.
5 – 25	Metallic iron. Very few soils in this range. You are probably over metal.
26–39	Very few soils in this range -- occasionally some saltwater beaches.
40–75	Red, yellow, and brown iron-bearing clay minerals.
75–95	Magnetite and other black iron minerals.

Ground Balancing (continued)

When ground balancing, try to "feel out" a spot on the ground to make sure there is no metal present.

In order to avoid locking onto metal, **the detector will not balance in DISCRIMINATION mode where the GROUND PHASE is less than 40.** Where the ground reads less than 40, enter AUTOTUNE mode (DISC LEVEL = At) and then perform the ground balancing procedure.

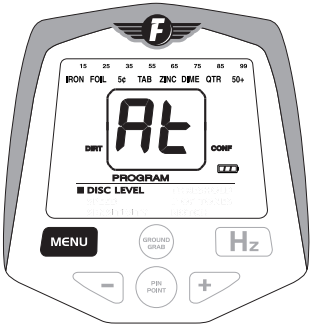
The detector will not balance in DISCRIMINATION mode where the GROUND PHASE is less than 40

If the ground balance adjustment is incorrect, there will be a difference in the sound as the search coil is either moving toward or away from the ground. It sounds like you are either *pulling the sound out of the ground, or pushing the sound into the ground.*

- If the sound gets louder as you raise the search coil, ground balance setting is too low.
- If the sound gets louder as you lower the search coil, the ground balance setting is too high.

Positive and Negative Response

The purpose of ground balancing is to adjust the metal detector to ignore ground minerals. If the setting is incorrect, ground minerals will give either a *positive* or a *negative* response, depending on which direction the adjustment is off. If the ground balance setting is not accurate, repeat the GROUNDGRAB procedure.



If the ground reads less than 40, enter AUTOTUNE mode (see Menu System pg. 12)

POSITIVE RESPONSE

If the Phase setting is too high a number, the response of minerals will be *positive*. This means that when the search coil is lowered to the ground in Pinpoint or Autotune, the sound will get louder as the search coil approaches the ground. The sound will grow quieter as the search coil is raised. What, if anything, you will hear in discrimination mode depends on the discrimination setting.

When searching in an AUTOTUNE mode, if ground balance is properly set to cancel the ground, and you sweep over a *positive hot rock*, the rock will give a "zip" sound similar to that of a metal object.

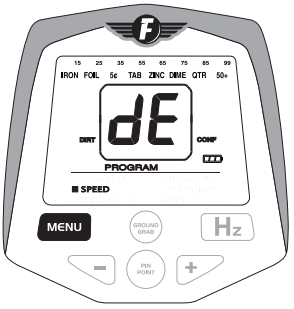
NEGATIVE RESPONSE

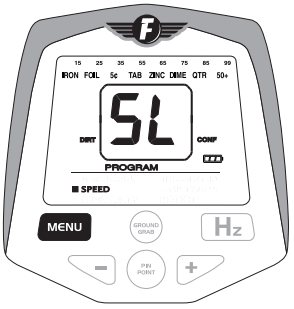
If the PHASE setting is too low a number, the response of minerals will be *negative*. When the search coil is lowered to the ground in Pinpoint and Autotune mode, the machine will be silent. The machine will sound off as the search coil is lifted away from the ground. What, if anything, you hear in discrimination model depends on the discrimination setting.

When searching in AUTOTUNE mode, a *negative hot rock* will produce a "boing" sound after passing over it, making it difficult to know where it is located. It will not have the sound and "feel" of a metal object.

Autotune Mode

The Autotune mode is more sensitive and offers better feel than the Discrimination mode, and is used to find all metal objects present in the ground. The search coil must be in motion for objects to be detected. This is a single filter search mode similar to the "fast autotune", "SAT", or "P4" mode found in other detectors you might already be familiar with.





SPEED

There are two speed selections, DEFAULT and SLOW:

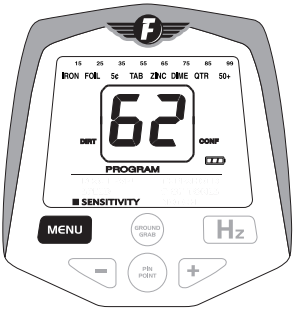
dE = default.

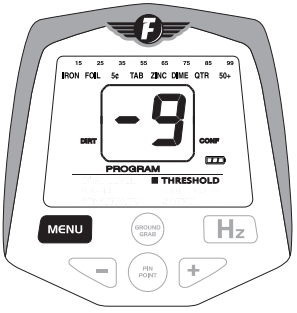
dE provides the best target separation.

SL = slow.

SL provides more sensitivity to deep targets. SL is more likely to result in noisy detector operation at high sensitivity levels.

SENSITIVITY This controls the signal gain, and is adjustable from 1 to 99. In the presence of electrical interference, high ground mineralization, or variable ground mineralization, operation will usually be too noisy (wobbly and erratic sound) if the sensitivity is set too high. At settings above 90, the internal circuit noise of the machine will probably be audible. The sensitivity level setting is largely a matter of personal preference. However, if you cannot hear at least some noise, the smallest or deepest objects will not be detected





THRESHOLD

Adjustable from -9 to 9.

At 9, you will hear the loudest background sound.

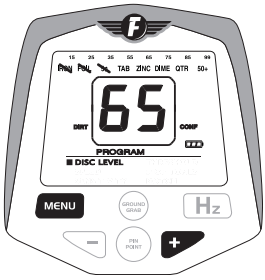
At -9, you will have the lowest possible level of background sound.

This is also referred to as audio threshold. For maximum ability to hear the weakest signals, adjust this audio threshold high enough so that it is barely audible while the detector is in use in the field. To eliminate the weakest signals, adjust the audio threshold level into the negative region, which will allow the machine to run silently if the Sensitivity is not set too high.

Discrimination Mode

The Discrimination Mode is used to eliminate trash metal objects from detection, e.g. nails, aluminum foil, or pull-tabs. The search coil must be in motion for metal objects to be detected. In comparison to the Autotune mode, discrimination incurs some loss of sensitivity to small or deep objects.

DISCRIMINATION LEVEL



This is adjustable from 0 to 65, and controls the range of objects to be eliminated from detection (discriminated out or rejected). Objects with numeric values below the selected discrimination level will not be detected. NOTE: the numerical range that pertains to each class of object is printed at the top of the visual display. To eliminate iron, a setting of 15 is usually about right. A setting of 65 will eliminate aluminum trash and zinc pennies, but nickels will also be lost, unless you notch-in nickels with the NOTCH feature.

To use DISC LEVEL

1. Highlight DISC LEVEL using the MENU button.
2. Press "+" or "-" to choose a number between 0 and 65.
3. A slash will appear over the word describing the target category being eliminated. When you select a value within any range, the slash will appear, *even though all values within that range might not be eliminated from detection.*
   To recall the discrimination setting, press the MENU button until you enter the DISC LEVEL feature.

SPEED

There are two speed selections, DEFAULT and SLOW:

dE = default.
SL = slow.
Slow speed provides more depth detection on more highly conductive metal objects. SL is more likely to result in noisy detector operation.

SENSITIVITY

This controls the *signal gain*, and is adjustable from 1 to 99. In the presence of electrical interference, high ground mineralization, or variable ground mineralization, operation will usually be too noisy (wobbly and erratic sound) if the sensitivity is set too high. At settings above 90, the internal circuit noise of the machine will probably be audible. The sensitivity level setting is largely a matter of personal preference. However, if you cannot hear at least some noise, the smallest or deepest objects will not be detected.

THRESHOLD

This control is useful in managing electrical interference and for eliminating shallow trash objects from detection.

In Discrimination Mode, this control also acts as a *target size filter.*

Adjustable from -9 to 9.

9 = accepts the smallest size targets. The detector may be noisy at this setting.
-9 = The maximum amount of elimination of small targets.
The detector will operate quietest at the -9 setting.

If you wish not to detect a target of a given size, or if you are detecting a specific small target, and wish not to detect it, then lower the threshold number.

Discrimination Mode (continued)

NUMBER OF TONES (# OF TONES)

This menu selection allows you to select the number of audio tones emitted by the detector. Different search conditions, search objectives, or personal preference will determine how many tones you want to hear. With the below settings, you can decide to hear the same tone, regardless of the target category, or have different categories of targets induce different tones.

The "# OF TONES" selections are:

1: SINGLE MEDIUM PITCH TONE.
All types of metal induce the same tone.

1F: MEDIUM-TO-HIGH PITCH TONE varying in proportion to target signal strength.
Large shallow objects will produce a squeal. The variable audio pitch provides you more information about the detected object, but some people find the sound on strong signals too annoying.

2F: TWO TONES.
Similar to **1F,** except that iron produces a low-pitched tone regardless of signal strength. Useful if you want to hear all targets and want to identify iron. Most relic hunters prefer this selection. If target is not iron, the pitch varies according to signal strength.

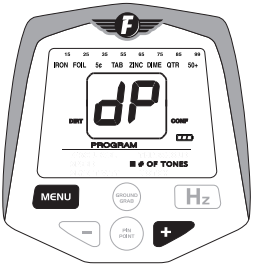
3H: Same as **3,** except that nickels produce a high tone.

3: THREE DIFFERENT AUDIO TONES. Iron produces a low pitch tone. Aluminum trash, zinc pennies, and nickels produce a medium tone. High conductivity coins produce a high tone. The 3-tone selection is often preferred for coinshooting. Most users will set the discrimination level below nickels, at about 25, and dig only objects that produce a consistent and repeatable high tone. **NOTE:** with this setting, steel bottle caps may produce consistent high tones, similar to coins.

4H: Same as **4,** except that nickels produce a high tone.
Useful when coinshooting in a trashy area.

4: FOUR DIFFERENT AUDIO TONES This selection is similar to **3,** but with a fourth medium-high tone for targets in the numeric range of 53 to 65. This four-tone system is useful for searching in areas where there may be very old coins which register in this range.

dP: DELTA PITCH This setting produces a tone whose pitch varies in relation to the visual ID number -- the higher the ID, the higher the pitch. Good for relic hunting. This setting is also useful in areas with a high concentration of steel bottle caps. Coins will produce a fairly constant pitch as you sweep back and forth. Bottle caps produce inconsistent tones, often with a *squawk* at the beginning of the sound.



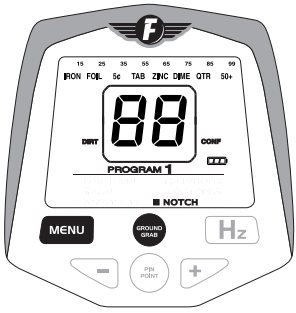
NOTCH

Unlike Discrimination Level, which eliminates all targets from the left of the scale to the right, NOTCH can eliminate and re-include targets within the scale displayed at the top of the display. Inclusion or exclusion of target ranges is indicated with a crossed icon.

*To demonstrate how to set a notch, follow this instruction at **first use.***

RESET DETECTOR

1. Turn detector off.
2. Press-and-hold both the GROUNDGRAB and MENU buttons.
3. Turn the detector on, while you are still pressing the buttons.
4. Detector displays “88”.
5. Release the buttons.
6. The detector is reset, and operating in program-1.



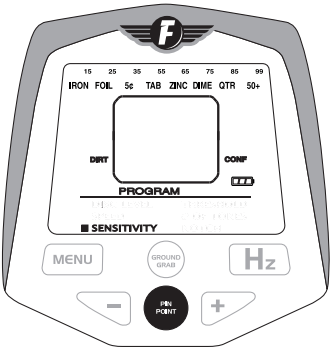
Then press MENU button to move down to the NOTCH selection.

1. Press “+” until the number **40** appears. Then press MENU again to accept this notch value. You must press menu to accept the notch setting. If MENU is not pressed, the display will time out with a notch programmed.
3. Notice that a slash appears across the word “TAB” printed on the top of the display.
5. All targets in the of the TAB range (TAB range is from 36 to 55) will be eliminated from detection.

The following are characteristics of NOTCH programming:

- As you press + or - to enter a notch range, the target indicator block at the top edge of the screen illuminates to show you the range you are in.
- After you have selected a notch, by pressing MENU again, a slash is illuminated (or not) over that range, indicating that all targets within that range are eliminated (or not) from detection.
- When you enter the program to make a change to the notch settings, you are **changing the status of the notch.** If no slash is illuminated and then you press MENU to set a notch range, you will be **notching-out** this range. If a slash was previously illuminated and you press MENU to set this notch range, you will be **notching-in** this range.
- **Programming a notch range always reverses the status of the notch.**

Pinpoint Feature



After a buried target has been located using the Autotune or Discrimination modes, you want to pinpoint the exact location of the target in order to facilitate its recovery. Accurate target pinpointing will minimize digging.

Activate the Pinpoint feature by pressing-and-holding the PINPOINT button. Unlike the Autotune and Discrimination modes, Pinpoint does not require motion to detect metal. Pinpoint will detect objects while the coil is in motion and will continue to detect metal if search coil motion stops over the target.

GROUND PICK-UP

If you have not performed the ground balancing procedure, the Pinpoint feature usually causes the ground to sound off. This means that while pressing-and-holding the Pinpoint button, the audio tone will get louder as you lower the search coil to the ground; this is called *ground pick-up.* Since you want to hear the target, rather than the ground, we recommend first ground balancing in order to eliminate ground pick-up. Alternatively, if you experience ground pick-up, you may place the coil very close to the ground, off to the side of the target; then press-and-hold PINPOINT, and raise the search coil slightly while passing it over the target.

HOW TO PINPOINT

Position the search coil an inch or two (2.5-5cm) above the ground, and to the side of the target. Then press-and-hold PINPOINT. Now move the search coil slowly across the target, and the sound will communicate the target's location. As you sweep from side to side, and hear no sound at the ends of the sweep, the target is located in the middle of that zone, where the sound is loudest and the audio pitch is highest. If the sound is loud over a wide area, the buried object is large. Use the Pinpoint feature to trace an outline of such large objects.

NARROW IT DOWN

To further narrow the field of detection, position the search coil near the center of the response pattern (but not at the exact center), release the PINPOINT button and then press-and-hold it again. Now you will only hear a response when the search coil is right over the top of the target. Repeat this procedure to narrow the zone even further. Each time you repeat the procedure, the field of detection will narrow further.

CONTROLLING SENSITIVITY IN PINPOINT MODE

If you wish to change the Pinpoint sensitivity setting, you must change the SENSITIVITY setting.

BUY A PINPOINTER

When you kneel down to unearth the desired object, you may find it frustrating as the object may appear exactly like the surrounding soil. You may hold the object in your hand, and find it necessary to pass a handful of dirt over the search coil to see if it contains metal. An easier way is to use a handheld pinpointer. It is a probe-like device which is poked into the ground, making close up pinpointing a snap, reducing digging time, and minimizing the size of the holes you will dig. Fisher Research Labs offers the **FPoint™** pinpointer, a robust and inexpensive device designed for this purpose.

LCD Visual Display

In normal operation, when the search coil passes over a metal object, the electrical signature (2-digit I.D.) of the metal object is displayed on the numeric display for 4 seconds, unless superceded by another detected object. On a given buried object, the number will bounce around if the signal is weak or if the amount of ground mineralization is high.

At the top of the display, a block illuminates to indicate the classification of the object.

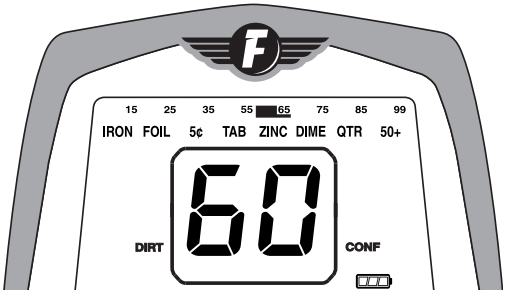
NUMERIC TARGET I.D. (2-digits)

The **following table** shows the numbers typically associated with certain commonly encountered nonferrous metal objects. Older silver U.S. coins usually read about the same as their modern clad equivalents. Modern quarter-sized dollar coins like the Susan B. Anthony and the Sacagawea read about the same as a quarter. Many Canadian coins are minted from a magnetic nickel alloy which gives very inconsistent readings and may register as iron. Most one-ounce silver bullion coins will fall into the same range as the modern U.S. $1 Eagle.

OBJECT	**TARGET I.D.**
foil from gum wrapper	16-25
U.S. nickel (5¢ coin)	typically 30
aluminum pull-tab	33-55
aluminum screwcap	60 - 70
zinc penny (dated after 1982)	typically 60
aluminum soda pop can	most often 63-69, but can vary widely
copper penny, clad dime	typically 70
U.S. quarter (25¢ coin), clad	typically 80
50¢ coin, modern clad	typically 86
old silver dollar coin	typically 90
US silver Eagle $1 coin	typically 91

PROBABLE TARGET I.D.

The probable target ID zones at the top of the LCD display represent the signal ranges produced by various coins and types of metal objects. When a metal target is detected, the microcomputer analyzes the signal and categorizes it based on what kinds of metal objects usually produce that kind of signal. The microprocessor then displays a block along the top of the LCD screen above corresponding category.



For instance, if the detected signal fits within the parameters usually exhibited by zinc pennies, the microcomputer will categorize the signal as "zinc penny". The LCD screen will then illuminate the block above the “ZINC”.

Copper pennies (pre-1982) will usually register in the DIME zone.

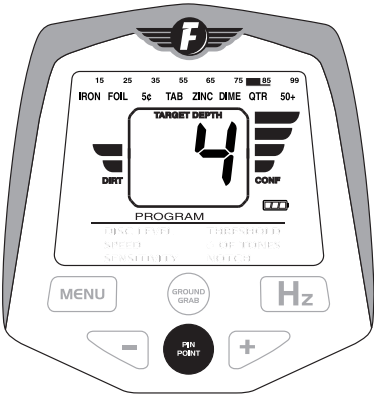
Most gold jewelry is small, and will tend to read in the 16-55 range. Silver jewelry usually has more metal in it and therefore tends to produce higher readings.

LCD Visual Display (continued)

Since different metal objects can produce similar signals, and since minerals in the soil can distort the signals, the probable target ID's are just that -- probable. There is no way of knowing for sure what's buried other than to dig it up. Experienced metal detector users have a rule of thumb -- "when in doubt, dig".

TARGET

The target indicators are at the top edge of the display. When a target is detected, a rectangle-like indicator will illuminate over the target category corresponding to the target's electrical characteristics.



DEPTH

When the PINPOINT is pressed-and-held to facilitate pinpointing an object, the numerical display indicates the approximate depth of the object, in inches, based on the assumption that the object is a typical U.S. coin. Small objects will read deeper than they actually are, and large objects will usually read shallower than they actually are.

CONF (Target Confidence Indicator)

This 4-segment graphic indicates how confident the detector is of the 2-digit target identification it has assigned. If all 4 segments are displayed, the detector is confident that the target ID is accurate. If 2 or fewer segments are displayed, the confidence is low. If no segments appear when the 2-digital ID is displayed, the detector has no confidence that the value is accurate; it has assigned its best guess. Junk targets tend to produce lower confidence indications than coin targets of similar electrical conductivity. Sloppy sweep technique also reduces the confidence indication. You can use this indicator to train yourself to sweep more skillfully.

DIRT (Ground Mineralization Indicator)

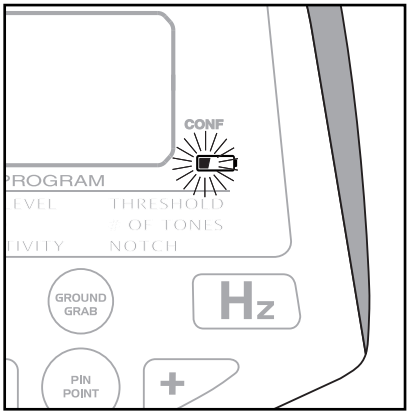
This bar graph displays the relative amount of magnetic mineralization (i.e. magnetic susceptibility) of the soil. The primary magnetic minerals in most soils are magnetite (black sand), and maghemite (a red clay mineral). The depth to which objects can be accurately identified is strongly influenced by the magnetic susceptibility of the soil. High values (4 bars) have a greater effect on detection depth in the Discrimination mode than in the Autotune mode. For the most accurate DIRT reading, pump the search coil as though you were ground balancing.

DIRT BARS	**Description**
4	Uncommonly heavy mineralization (not uncommon in goldfields)
3	medium mineralization
2	light mineralization
1	very light mineralization
blank	White beach sands

LCD Visual Display (continued)

BATTERY CONDITION INDICATOR

Fresh alkaline batteries will illuminate all three bars. When no bars are displayed and the batteries are about to go dead, the left-most segment will start flashing. Replace the batteries when the indicator flashes. When no battery segments are illuminated, the detector will lose power in a minute or so. The detector should operate for about 30 minutes from the time the indicator starts flashing. If using NiMH rechargeable batteries, the display will remain stuck on the second or third bar for most of the battery life; when it drops to the first bar, the batteries will go dead within several minutes.



GROUND PHASE

This is the ground balance setting, 0-99. It is displayed when ground balancing with the GROUND GRAB button.

SETTING

This is illuminated when you are in the menu, adjusting a MENU selection value. When the word “SETTING” is indicated, the number being displayed is a setting, and not, for instance, a Target ID indication.

Hz: Frequency Shifting

One characteristic of a highly sensitive metal detector, operated at high sensitivity levels, is its susceptibility to electrical interference from other electronic devices. If the detector chatters while the search coil is not in motion, the cause is either electrical interference or internal circuit noise due to a high sensitivity setting. If the detector chatters or emits intermittent false signals in the field, you are also probably experiencing electrical interference. If you suspect electrical interference, you may change the **F70's** operating frequency. This is a trial and error method to try to find a frequency different from the suspected source.

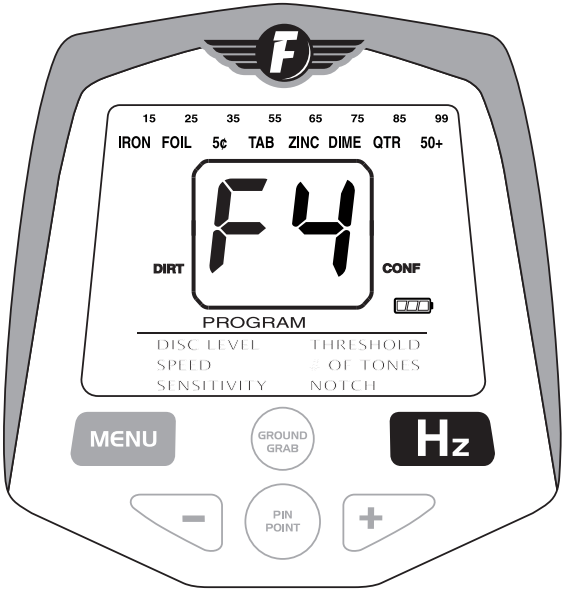
To shift frequencies:

1. Press Hz.
2. Each frequency change requires a push of the MENU button. Each actuation will shift the frequency by one value.

The LCD will display the frequency, from F1 to F7. F1 is the lowest frequency. F4 is default. The **F70** will NOT retain a change in frequency setting when powered off.

See the Search Techniques section of this manual for more information on electrical interference.

The ground balance point will change when you change frequency, so after changing frequency, remember to re-balance using the GroundGrab procedure.



Capabilities and Limitations

DEPTH

The **F70** can detect U.S. coins to a depth of up to 13-14 inches (35cm) under good conditions. Large objects (55 gallon drums, manhole covers, etc.) can be detected to a depth of up to several feet (1-2 meters).

Electrical interference from power lines and from electrical appliances and electronic equipment can reduce detection depth, or cause audible interference, making it necessary for the user to reduce the sensitivity setting. Soils with large amounts of iron or salt minerals may also reduce detection depth or necessitate a reduction in the sensitivity setting.

TARGET IDENTIFICATION

The **F70** identifies the probable type of metal object by measuring its effective electrical conductivity, which is displayed as a number from 0 to 99 on the LCD screen. The *effective electrical conductivity* of an object depends on its metallic composition, size, shape, and orientation relative to the search coil. Since coins are minted to tightly controlled specifications, they can be accurately identified. Identification of pull-tabs and foil is less consistent because these kinds of targets come in wide variety. In general, smaller objects, and objects made from lower conductivity alloys such as iron, bronze, brass, lead, pewter, and zinc will read lower on the effective conductivity scale. Larger objects and objects made from higher conductivity alloys such as silver, copper, and aluminum, will tend to read higher. The notable exceptions are gold, which usually reads low because it is rarely found in large pieces, and zinc pennies, which read moderately high because of their size and shape. Although nails and other iron and steel objects will usually give low readings, ring-shaped pieces of iron (for instance steel washers and harness rings) will usually produce medium to high readings. Flat pieces of iron or steel, such as can lids, and steel bottle caps will occasionally do the same.

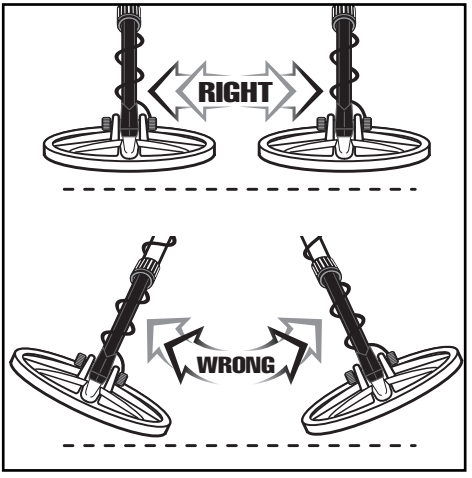
Most targets can be identified accurately in air to a distance of about 10 inches (25cm) . The minerals in many soils will cause identification to be less accurate. In most soils, effective target identification can be achieved to a depth of at least 6 inches (15cm).

Capabilities and Limitations (continued)

REQUIREMENT FOR MOTION: PINPOINT FEATURE

As with other modern metal detectors, the **F70's** search coil must be kept in motion in order to both detect and identify targets. The Autotune mode is more forgiving of sweep speed variation than is the Discrimination mode.

The Pinpoint feature continues to detect metal if search coil motion stops over the target. The Pinpoint feature is used primarily to Pinpoint the exact location of a target so that it can be retrieved with a minimum of digging, and does not provide target identification.



GROUND BALANCING

To achieve maximum depth in any detection mode, as well as when using the Pinpoint feature, the **F70** offers the ability to cancel out ground minerals automatically using the GROUNDGRAB feature.

If you do not perform the ground balancing operation, the Discrimination mode will usually still work fairly well, but the Autotune mode will not. The Pinpoint feature can be used for pinpointing objects at moderate depth in most soils without prior ground-balancing.

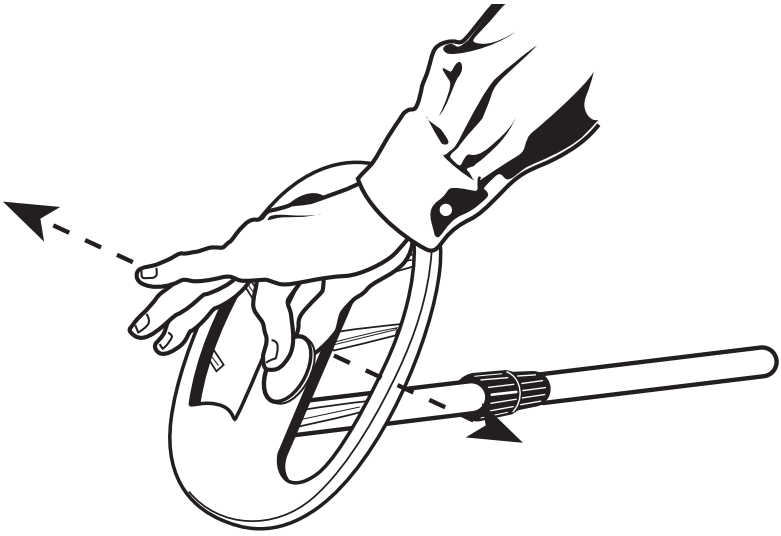
The internal computer can cancel salt water only while in the Autotune mode.

DISCRIMINATION

Discrimination refers to a metal detector's ability to ignore metal objects in selected categories, especially iron and aluminum. This makes searching much more pleasant in an area with a lot of metal trash. The F70 offers a wide variety of discrimination features which you can select according to the search conditions and your personal preference.

DEPTH READING

The estimated Depth Reading displayed when in Pinpoint mode is based on the strength of the signal. It is calibrated for typical coin-sized objects. Smaller objects will read deeper than they actually are, and large objects will read shallower than they actually are.



AIR TESTING

There may be times when you want to test or demonstrate the metal detector without sweeping it over the ground, for instance, if not fully assembled, or if you are indoors. To air test, place the search coil in a spot where the detector is stable and more than two feet away from any large masses of metal, including the reinforcing steel usually present in concrete. If you are wearing a wristwatch or jewelry on your hand or arm, remove it. Then, test or demonstrate by waving metal objects over the search coil; wave objects briskly, several inches over the top of, and parallel to, the search coil.

Ground balancing cannot be tested or demonstrated in air unless you happen to have appropriate specimens of iron minerals available.

SWEEP SPEED

The **F70** is noted for its quick response. It permits the user to sweep the search coil quickly in order to cover more ground with very little risk of losing targets. In general, if you are searching an area where the desirable targets are more than 8 to 10 inches deep, a faster sweep speed will detect to a greater depth and yield more accurate target IDs. Another way to achieve greater depth detection is with the SL Speed Control.

CHECKING A TARGET

In order to most accurately verify a detected target with most other metal detectors, users will narrow their sweep and loiter over the top of the target. The **F70** is different. The **F70's** quick response and advanced signal sampling system produces the most accurate target IDs with deliberate (shoulder width) sweeps all the way across the target, even if there are other targets nearby. If you check targets using sweep techniques learned on some other detectors, you run the risk of getting less accurate target IDs. You can use the confidence level indicator to improve your technique.

Search Techniques

SWEEPING SEARCH COIL (this does not apply to Pinpointing)
Keep the search coil in motion to detect targets. Sweep the search coil parallel to the ground; do not lift the search coil at the end of the sweep.

When you have located a target and continue sweeping back and forth for verification, use broad, deliberate sweeps across the target for the most accurate target ID. Do not use short sweeps as you might with other metal detectors.

SHALLOW TARGETS
Shallow targets tend to give multiple responses, with the last response being the one that remains illuminated on the visual display. This last response is usually sampled at the edge of the search coil and will tend to be inaccurate. If you suspect a shallow target (within 2 to 3 inches of the search coil), lift the search coil slightly, and slow down your sweep speed until you notice a single response consistently in the same place.

Large shallow targets can cause signal overload, indicated by the siren sound. In these instances, raise the search coil until the overload warning disappears, and sweep at this increased height.

LARGE TARGETS
If an overload warning is not confined to a small spot, you are probably overloading on a large object, for example, a large iron pipe, reinforcing steel in concrete, or buried sheet metal. It is usually not possible to locate objects, such as coins, in close proximity to large masses of metal.

PINPOINTING
When you turn the **F70** on, the ground balance setting is preset to give a positive response on nearly all soils. This means that if you holding the PINPOINT button, the audio tone will get louder as you lower the search coil to the ground. But you do not want to hear the ground; you just want to hear the target. So always Ground Balance first.

After you have discovered a buried metal target using the AUTOTUNE or DISCRIMINATION Modes, use PINPOINT to find its exact location.

Position the search coil an inch or two (2.5-5cm) above the ground, and to the side of the target. Then push PINPOINT. Now move the search coil slowly across the target, and the sound will communicate the target's location. As you sweep from side to side, and hear no sound at the end of the sweep, the target is located in the middle of that zone, where the sound is loudest and the audio pitch is highest. If the sound is loud over a wide area, the buried object is large. Use the Pinpoint feature to trace an outline of such large objects.

ESTIMATING TARGET SIZE, DEPTH, AND SHAPE

When Pinpoint is activated, the LCD displays estimated depth. The estimate is based on the presumption that it is a coin-sized target.

But what if it is not a coin-sized target? The most common example is that of an aluminum can. Flattened aluminum cans are usually identified as zinc, pennies or as dimes. Their large size will produce a strong signal, tricking the microcomputer into thinking that it is a shallow coin.

The following explains techniques for differentiating buried aluminum cans from coins. Sweep back and forth to get a feel for the target, keeping the search coil close to the ground. Now, continue to sweep back and forth as you slowly raise the search coil higher and higher. If the response diminishes quickly and never gets very broad, the target is probably a coin. If the response diminishes slowly as you lift the search coil, and you get a broad response, the target is probably an aluminum can. If you practice this by laying a coin and a flattened aluminum can on the ground, you will quickly understand how to differentiate the two and you will probably never have to dig another aluminum can again. And, you will know whether it was deep or shallow. This technique works well in the Autotune mode, and to a lesser extent in Discrimination mode.

Objects which are ring-shaped, or flat and round like coins, tend to give a narrower, crisper response than objects of similar size with irregular shapes. The easiest way to demonstrate this is with an aluminum screwcap from a soda bottle. In its normal shape, it occupies a volume, and gives a somewhat broader response than that of a coin. But if you flatten it, the response will be crisper and more like that of a coin. Again, these differences are most readily noticed in the Autotune mode.

Long skinny iron or steel objects such as nails usually produce a double response when scanned lengthwise, and a weaker single response when scanned crossways. This is most noticeable in the Autotune mode. However, a coin lying on its edge can produce a similar response, so rely on both the target ID as well as *target feel* to distinguish between different kinds of objects. Objects within 2 inches (5cm) of the search coil will often produce multiple responses as you sweep across them, because the response field close to the search coil is irregular.

Search Techniques (continued)

ESTIMATING TARGET I.D.

With a single sweep over a target, you will usually see a 2-digit target ID displayed on the LCD. Repeated sweeps back and forth over the target may cause the 2-digit target ID values to change with each sweep of the coil; this may seem inconsistent with your discrimination setting. These variations and inconsistencies provide important clues regarding the identity of the buried object.

The visual ID and the discriminator are independent systems which analyze different sets of signals. Therefore what you hear, or do not hear, provides additional information regarding target ID. For instance, if discrimination is set at 12, and most sweeps result in no visual target ID, the target is most likely iron even though the majority of the ID numbers will be greater than 12.

The **F70** has a tendency to *up-average* nonferrous targets in the proximity of iron, indicating ID numbers higher than would be obtained in an air test. This tendency is connected with the **F70's** enhanced *see-through* ability – that is, the ability to find valuable targets in an area where there is a lot of iron trash.

FALSE SIGNALS AND CHATTER

At times the detector may beep when there is nothing there, or it may seem like there is nothing there. There are five major causes for this: electrical interference, nuisance buried objects, ground minerals, hot rocks, and sensitivity set so high that internal circuit noise is audible. The problem can usually be corrected by reducing the sensitivity setting, but sometimes other measures can also be taken.

ELECTRICAL INTERFERENCE

Electrical Interference can be caused by power lines, appliances, computer equipment, cell phones, fluorescent and vapor type lamps, household light dimmers, other nearby metal detectors, electric fences, radio transmitters, and electrical storms. If you get abnormal noise while holding the search coil motionless in the air, the cause is electrical interference or internal circuit noise. By walking around with the metal detector, you can often *follow the signal* and track it back to the offending device; simply turn the device off, or come back at another time when it may be off. If the interference is from power lines, you might try another time of day. Interference on power lines is usually caused by something connected to them which may be idle in the evenings or on weekends. If the interference is from a communications or broadcast transmitting antenna, reducing the sensitivity is usually your only recourse.

The **F70** allows you to shift operating frequencies to avoid electrical interference. See the Frequency Shifting section for information about this technique.

NUISANCE BURIED OBJECTS

In some areas there is a lot of metallic trash which produces weak signals. These could include deeply buried objects, little bits and pieces of rusty iron and corroded foil. These items can be detected, but are difficult to pinpoint due to their depth and small size. When you dig and find nothing, it may seem like the machine is beeping at nothing even though there is actually something there. The best solution is usually to reduce sensitivity.

If searching a very trashy area and unwanted signals are a problem, search with the search coil 2 inches (5cm) away from the ground. Trash objects very close to the search coil will sometimes not be completely eliminated, even when the discrimination setting should have eliminated the target.

Metal detectors are designed to see one metal object at a time. Where there are two iron objects near each other, the detector can be fooled into thinking that the gap between them is nonferrous metal. This is a common condition where a wooden building has burned or been torn down, and the site is littered with nails. A signal from a nonferrous metal object such as a coin will usually be repeatable, whereas a false *positive signal* resulting from multiple or oddly shaped iron objects will seem to wander around and even to vanish. Experienced detectorists call these *non-repeating signals* and usually do not bother digging them since nonrepeating signals are almost always trash.

GROUND MINERALS

Conductive mineral salts usually produce broad signals which will not be mistaken for a metallic object. Common causes are concentrations of mineral fertilizer, spots where evaporation has concentrated naturally occurring mineral salts, residue from de-icing salts, and urine from livestock. Unless dry, “cow pies” can sound off like they are metal. Ocean beaches have salt water—this subject is discussed elsewhere in the manual.

In spots where there has been intense fire, such as a campfire site or where a stump was burned during land clearing, the soil minerals may be altered by oxidation so that their ground balance setting is lower than that of the surrounding soil. In such cases, search slowly.

In some areas, electrically conductive industrial minerals such as fuel coke, slag, clinkers (left over from burning mineral fuels), or charcoal have been dumped or used as landfill. Individual lumps of these materials can usually be quieted by reducing sensitivity and searching with a discrimination level of at least 25. However, where the ground consists primarily of such materials, you may not be able to search quietly. In that case, do not dig unless a signal is crisp and repeatable.

Electrically conductive natural minerals such as graphite, graphitic slate, or sulfide ore minerals are rarely encountered except when gold prospecting. When gold prospecting, you need to be able to hear everything, and you can expect to dig conductive minerals that turn out not to be gold. In a given locality you may learn to recognize what type of rocks these minerals are found in, and to ignore them if people in the area say that gold is not found in rocks of that type.

Search Techniques (continued)

HOT ROCKS

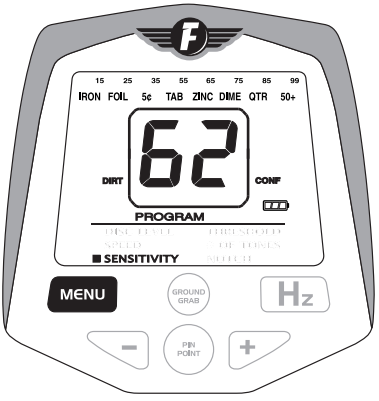
A *hot rock* is a rock which causes the metal detector to sound off because the rock contains iron minerals. They come in two basic types.

NEGATIVE hot rocks (also called cold rocks) are usually magnetite or contain magnetite, and give a negative response because their ground balance value is a higher number than the soil they are found in. They tend to be dark in color, usually black, and usually heavy. In some cases they will have rust stains. They are usually attracted to a magnet, and for this reason gold prospectors always carry a magnet—the ultimate ferrous/nonferrous discriminator. In Autotune mode, negative hot rocks produce a *boing* sound rather than the *zip* sound of a metallic target; recognize the difference and you will learn to ignore them.

POSITIVE hot rocks are iron-bearing rocks which have been oxidized by natural weathering processes so that their Ground Balance number is a number lower than the soil they are found in. They are often small, right on the surface, sound just like a gold nugget, and are common in many gold prospecting areas. They are usually, but not always, drawn to a magnet. They are most often reddish in color but are often black, brown, or yellow. On relic hunting sites, red clay bricks and rocks which have lined a fireplace or a campfire will often be *hot rocks.* The discriminator will usually eliminate them without difficulty if widely scattered, but if there is a large concentration of them, the discriminator may not quiet them all. In that case, you can revert to the rule of thumb -- “don’t dig non-repeatable signals”.

USING THE SENSITIVITY CONTROL

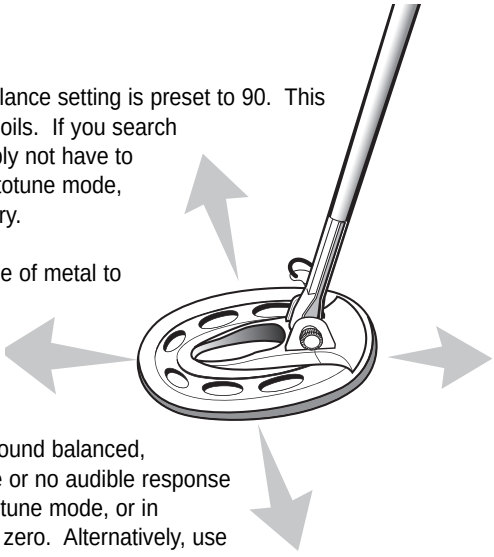
When the **F70** is first turned on, the Sensitivity is at a medium setting appropriate for most coinshooting. For relic hunting or gold prospecting, higher Sensitivity settings are usually preferred.



In the event of detection of electrical interference from electrical power lines, electrical or electronic appliances, or another metal detector, it is usually necessary to reduce the Sensitivity setting to achieve quiet operation. Alternatively, use the Frequency Shift feature described earlier in this manual.

If, while searching, you are constantly getting signals from which you cannot recover metal targets, you may be detecting small or deep targets which are not recoverable using the methods at hand. So, you may do better if you reduce the Sensitivity setting.

TIPS ON GROUND BALANCING



When the **F70** first turns on, the ground balance setting is preset to 90. This will give a *positive* response on nearly all soils. If you search in the Discrimination mode, you will probably not have to balance to the ground. If you switch to Autotune mode, ground balancing will probably be necessary.

You must find a spot of ground which is free of metal to accurately balance to the ground. Before you attempt to Ground Balance, sweep back and forth to see if any metal target is present. Locate what seems to be a clear area and then Ground Balance using the GroundGrab procedure. After you have ground balanced, sweep back and forth to see if there is little or no audible response to the soil. This is best done either in Autotune mode, or in Discrimination mode with Disc Level set to zero. Alternatively, use Pinpoint to check the spot. If there is little or no response, ground balancing was successful. If there is still substantial response, there may have been metal present where you attempted to ground balance, so find another promising spot and try again. If you cannot find a spot to successfully ground balance, it is time to give up.

In most areas, once you have ground balanced, the ground balance setting will remain satisfactory for a long time. However, if the soil has been disturbed by digging or the addition of fill dirt, or if you are in a geologically complex setting such as is commonly encountered in gold prospecting areas, you may have to frequently perform the ground balancing procedure to accommodate changing soil conditions.

When you ground balance, the numerical Ground Phase will momentarily appear on the LCD screen. In general, sandy or gravelly soils will tend to read in the 75-95 range, light colored loams and clays will tend to read in the 50-80 range, and red clays will tend to read in the 35-55 range. To express it in other terms, the more highly weathered, oxidized, or finely grained the soil is, the lower the numeric reading will tend to be.

The DIRT bar graph indicates how much iron mineralization is present. For it to work, the search coil must remain in motion. The most accurate readings will be achieved by *pumping* the coil as you do when ground balancing. The higher the mineralization, the greater the necessity to ground balance the detector for the best depth performance.

If you are searching for relics, you can make a map of the soil of the site. Make a grid of the site. Then collect data. Ground Balance to document mineral *type*; view mineral *amount* on the DIRT bar graph. Then plot the data on the site map and draw isolines. In this way you may be able to locate areas which have been dug, backfilled, or subjected to fire. This information in turn helps to reveal the history of the site.

Detecting Activities

Coinshooting

Coinshooting is searching for coins, usually in places like parks, schoolyards, church lawns, and people's yards. In most places where coins are likely to be found, there is also a lot of aluminum trash like pull-tabs and bottle caps, as well as steel bottle caps and often nails. Sometimes there is jewelry present. You will usually search using discrimination to get rid of the iron and the aluminum trash, even though this mode will cause you to miss some of the jewelry.

Much coinshooting is done in lawn areas, where digging holes would cause damage to the grass. We recommend use of an accessory hand-held pinpointer in such cases. Recovering targets is usually done by first accurately pinpointing the target, then carefully cutting a slit in the turf with a knife, and tamping it firmly when you are finished. In these situations, you cannot recover deep targets for fear of damaging the turf, so you can cut down on nuisance signals by reducing the sensitivity.

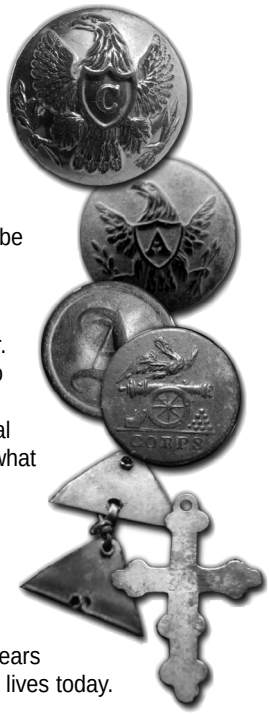
When searching on private property, first get the permission of the property owner. Most of the public places where one is likely to do coinshooting are city, county, or school district property. There is usually no ordinance prohibiting use of a metal detector as long as you are not causing damage. Sometimes such ordinances do exist. Administrators and security personnel often have the legal authority to prohibit any activity they do not like even if there is no ordinance against it. If there is a metal detecting club in your area, someone will usually know what areas can and cannot be searched.

Be prepared to always put your best foot forward when using a metal detector in a public place. Pick up any trash you recover; put it in a pouch or pocketed apron. This way you can explain that you are performing a public service by helping keep the place free of trash, especially pieces of metal or glass that could endanger a child at play. Be proficient at recovering targets without causing damage to the lawn. Explain that whenever you find jewelry which has personal identification marks, such as a class ring, you make an attempt to determine the owner and to return it. When someone who questions what you are doing understands that you are causing no damage and are actually performing a public service, you will usually be welcome.

Relic Hunting

Relic hunting is searching for historical artifacts. The most common desired objects are battlefield debris, coins, jewelry, harness hardware, metal buttons, trade tokens, metal toys, household items, and tools used by workmen and trades people. The most common unwanted metal is iron (nails, fence wire, rusted cans, etc.), but some iron and steel objects such as weapons may be valuable. If you are at a site where you may encounter unexploded ordinance, use caution.

Relic Hunting (continued)



Most relic hunting locations are in fields, forested areas and vacant lots where digging holes will not damage turf grass, so having a detector with good depth sensitivity is important. Some places are so littered with iron that it is necessary to discriminate out iron in order to be able to search, even though you may miss some potentially valuable artifacts.

Before you go relic hunting, obtain permission from the property owner. If you intend to hunt on public land, check first with the administrator to make sure it's not illegal. Certain kinds of sites, on both public and private land, are protected by law from relic hunting. If there is a metal detecting club in your area, some of the members will probably know what the laws are in that area and which sites are off limits.

Relic hunting is most rewarding if you have an avid interest in history. In many cases, the value of a relic is not the object itself, but the story it's a part of -- what historians call *context* and archeologists call *provenance.* A few pieces of rusty metal can tell the story of life in a specific place, or that of a specific family or person from hundreds of years ago. They can capture our imagination and help to give context to our lives today.

The value and context of a find can be readily lost without proper documentation and storage. Add finds to your collection with care. Take the trouble to understand the site you are searching and keep track of where you find things. Describe exactly how and where items were found. Consider including a sketch of the site with your finds. Organization techniques might include storing together all finds from the same site. Alternatively, if you have an interest in specific items, like buttons, make a button collection, and within that collection, document the circumstances surrounding each button found. If your finds are mixed together, without categorization or documentation, their context will be lost.

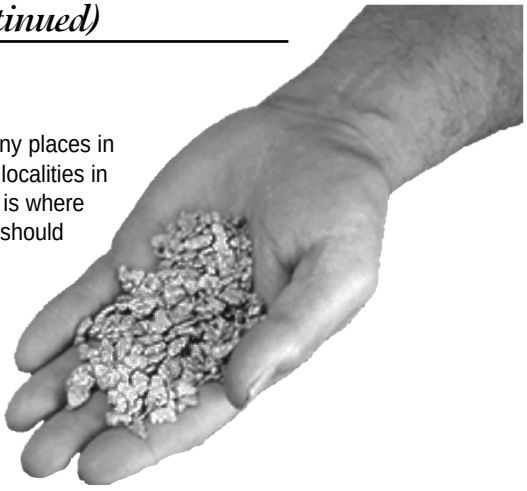
The ground balancing and DIRT bar graph features of the **F70** can be used to map the soils of a site. In this way you might determine which areas have been dug, backfilled, or subjected to fire. This information in turn helps to reveal the history of the site.

To find promising sites to hunt, conduct research at your local library, look for clues in old newspapers, and seek information on the Internet. Where did buildings used to be? Which have since been torn down? Where did people gather for public events like dances and county fairs? Where did train and stage lines run? Where were the swimming holes? In almost every town there is a historical society and museum of local history. Most museums are grateful for anything they can put on display, and when you dig something you cannot identify, the curator can often identify it for you. If you work closely with the local historical society or museum, landowners will be more willing to grant you permission to search their property.

Some of the most promising sites for relic hunting are places being cleared for development. After the site is built on, whatever is in the ground will become inaccessible. The property owner can often be persuaded that the site should be searched immediately while it is still searchable.

Detecting Activities (continued)

Gold Prospecting



In the United States, gold is found in many places in the western states, Alaska, and in a few localities in the Appalachians. The old saying "Gold is where you find it", means that to find gold, you should look in areas where the yellow metal is known to be present.

Hillsides are the best areas for gold prospecting using a metal detector, because hillsides cannot be cleaned out by panning and dredging the way streams can. Also, gold on hillsides, not far from its source vein, tends to be larger, and hence more readily detected, than alluvial (placer) gold which tends to get pounded to pieces and worn away as it rolls along the streambed with gravel during floods. Gold is valuable because it is a scarce commodity. Even in a good gold producing area, you will often spend an entire day without finding any gold. Meanwhile you will dig bits and pieces of other metal-- birdshot, shells and bullets from hunting and target practice, bits of rusted barbed wire, chips off shovels and other mining tools, rusted tin cans, etc. Hot rocks -- rocks containing concentrations of iron oxides that sound like metal when you pass over them -- are also a nuisance in many gold areas. Discrimination is usually ineffective because the loss of sensitivity resulting from discrimination is enough to cause those little nuggets to vanish. If you have gone many hours without finding gold and are wondering if there is something wrong with your metal detector or how you are using it, the most important clue is this: if you are digging *tiny* pieces of trash metal, then if you had swept over gold nuggets, you would have dug them too!

Because most gold nuggets are tiny, and are usually found in soil which is high in iron oxide minerals, serious gold prospecting requires a detector with high sensitivity and true ground balanced autotune operation. Run the machine with the sensitivity high enough to hear some noise from ground minerals, and *learn the language* of the sounds you hear. Headphones are recommended unless consideration for safety (for instance rattlesnakes) rules them out. Move the search coil slowly and deliberately, carefully controlling its height above the ground to minimize noise from iron minerals in the soil. If you hear ground noise, your Ground Phase could be a bit off, so perform the ground balancing procedure again. As you walk even a very short distance, ground conditions can change. The ground geology typically associated with gold will tend to change over very short distances.

The DIRT bar graph indicates the amount of iron mineralization in the soil. In most gold fields, especially alluvial (placer) deposits, gold tends to be associated with iron minerals, especially magnetite *black sand.* If you know this to be the case in the area you're working, you can maximize your gold recovery by concentrating your effort on areas where the bar graph indicates higher amounts of iron mineralization.

Gold Prospecting (continued)

Gold prospectors are mostly a friendly bunch, and willing to spend some time showing a beginner how to increase his odds of finding the yellow stuff. Many will invite you to search on their claims (if they have any) once they get to know you. In some gold areas, a lot of the terrain is under claim, so you need to learn how to recognize posted claims and stay off of them unless you have the claim owner's permission. Prospecting clubs such as the GPAA often own claims which are open to their members, and sponsor group outings to good gold areas.

To dig into the ground and pull out a precious piece of yellow metal that you are the first person on earth to see, can be a thrilling experience. If you love being outdoors, have patience, and can stay motivated by the prospect of finding that next nugget, then *beeping for gold* may be the hobby for you. Not many get rich prospecting, so think of it as outdoor recreation where your finds might defray the expense while having fun doing it!

Cache Hunting

A *cache* (pronounced "cash") is an accumulation of money, jewelry, gold, or other valuables, which someone has hidden. When people bury a cache, they usually put it in a strongbox or in a jar. To search for a cache, you first need a reason to believe the cache may exist. This means doing research. Some caches have been the subject of many stories you can read about in print, but you need to be able to sort fact from fiction. If you can get copies of old newspaper stories about the circumstances surrounding the hiding of the cache, you may find discrepancies which help you to judge the reliability of the information available. Often the best information on an old cache is to be learned from old timers who live in the area where the cache is thought to be. In the case of newer caches, often the only information is what can be obtained from family and acquaintances of the person who is believed to have hidden the cache.

The ownership of a cache is not always clear. Sometimes it belongs to the person or heirs of the person who hid it, sometimes it belongs to the owner of the property on which it is located, and sometimes it belongs to the person who finds it -- or some combination of the above. If the contents of the cache were stolen, this fact can also complicate the question of ownership. Find out what laws apply to the cache in question, and always make sure that the issue of ownership is resolved prior to recovering a cache.

Compared to a coin, a cache is usually large and deep. Searching in Autotune mode is recommended. However, for a really deep cache, it may be advantageous to search in PINPOINT, by keeping the button depressed, frequently releasing and re-depressing the button momentarily to maximize sensitivity.

Detecting Activities (continued)

Shallow Water Hunting

All **Fisher Research** Labs search coils are waterproof, allowing you to search in shallow water to about two feet deep. If searching around water, be careful not to get the electronics housing wet. Avoid salt spray, as it will work its way into the control housing and damage the electronics -- such damage is not covered by the warranty.

Both fresh and salt water beaches are popular places for metal detecting. Vacationers lose money and jewelry playing in the sand and in the water. It is usually easy to dig in a beach environment, and metal detecting is permitted on most beaches. Occasionally you may be able to help someone recover a piece of jewelry they have lost minutes before, this is a gratifying experience.

When searching on a beach, it is best to either search in Autotune mode, or to search with the discrimination level set just high enough to eliminate iron, because the value of beach finds is largely in the jewelry rather than in the coins. You will dig a lot of aluminum trash, but the digging is easy, and you can tell people that you are helping to clean up the beach and make it safer for people's feet. We recommend the use of special *sand scoop* for recovering valuables from the sand quickly -- most metal detector dealers sell these.

The electrical conductivity of the water itself can pose some challenges. You may get false signals when going into and coming out of the water, making it necessary to pay careful attention to keep the coil either in or out of the water, but not to touch the surface. This effect may be observed in either fresh or salt water.

Salt Water Hunting

Salt water is highly conductive, and produces a strong signal which is like that of metal. The **F70** is not specifically designed for top performance in salt water, but can be used in this environment.

If you desire to search in or over salt water, the following measures will usually be sufficient to silence the salt water response while retaining acceptable sensitivity:

1. Set the detector to Autotune mode (At).
2. Set the **sensitivity** to **less than 30.**
2. Use GroundGrab button to balance.
3. Search in the Discrimination mode with a discrimination setting higher than 20.

How Metal Detectors Work

Most hobby metal detectors use *VLF Induction Balance* technology. Here's how they work.

The search coil (also called search head or loop) contains two electrical induction coils which are like antennas. One coil transmits a rapidly alternating magnetic field, *illuminating* the region surrounding the search coil. If metal is present, its electrical conductivity distorts the magnetic field. If iron metal is present, its magnetism also distorts the magnetic field, but in a different way, allowing the metal detector to distinguish between ferrous and nonferrous metals.

The other coil is a receiving antenna which detects changes in the magnetic field caused by the presence of metal. Electronic circuits amplify this weak signal, analyze it to determine the changes which occur as the search coil sweeps over the target, and then convey the information to the user in the form of a visual display or audio tones. Most modern metal detectors perform many of these tasks in software running on an internal microcomputer.

The iron minerals which are present in most soils also distort the magnetic field, obscuring the weak signals of small or deep objects. This can cause the object to go undetected, or to be misidentified when it is detected. Much of the technology that goes into modern metal detectors is devoted to the task of eliminating the unwanted signals from iron minerals in the soil, while not losing the signals from metal objects.

Treasure Hunter's Code of Ethics:

- Always check Federal, State, County and local laws before searching.
- Respect private property and do not enter private property without the owner's permission.
- Take care to refill all holes and try not to leave any damage.
- Remove and dispose of any and all trash and litter found.
- Appreciate and protect our inheritance of natural resources, wildlife and private property.
- Act as an ambassador for the hobby, use thoughtfulness, consideration and courtesy at all times.
- Never destroy historical or archaeological treasures.
- All treasure hunters may be judged by the example you set; always conduct yourself with courtesy and consideration of others

Copyright Fisher Research Labs, Inc. September 17, 2008

5-Year Limited Warranty

The **F70** metal detector is warranted against defects in materials and workmanship under normal use for five years from the date of purchase to the original owner.

Damage due to neglect, accidental damage or misuse of this product is not covered under this warranty. Decisions regarding abuse or misuse of the detector are made solely at the discretion of the manufacturer.

Proof of Purchase is required to make a claim under this warranty.

Liability under this Warranty is limited to replacing or repairing, at our option, the metal detector returned, shipping cost prepaid to Fisher Labs. Shipping cost to Fisher Labs is the responsibility of the consumer.

To return your detector for service, please first contact Fisher Labs for a Return Authorization (RA) Number. Reference the RA number on your package and return the detector within 15 days of calling to:

Fisher Research Labs, Inc.
1465-H Henry Brennan Dr.
El Paso, TX 79936
Phone: 915-225-0333 ext.118

Warranty coverage does not include the cost of transporting the detector back to an owner who is located outside of the United States of America.

NOTE TO FOREIGN COUNTRY CUSTOMERS
This warranty may vary in other countries, check with your distributor for details.
Factory warranty follows the channel of distribution.
Warranty does not cover shipping costs.

Fisher Labs

Copyright© 2009 by Fisher Research Labs, Inc.

All rights reserved, including the right to reproduce this book, or parts thereof, in any form.

Published by Fisher Research Labs, Inc.
Fisher® is a registered trademark of Fisher Research Labs, Inc.

www.fisherlab.com
1-800-685-5050